



NAPPPFAST

NCSU APHIS Plant Pest Forecast

Degree Day Modeling and Reporting

Dan Borchert and Chris Chanelli

USDA-APHIS-PPQ-CPHST

Raleigh NC

2007 Japanese Beetle Program Meeting

Wilmington OH

JB Reporting Site

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Degree Day Model: Theory

- “Phenology and development of most organisms follow a temperature dependent time scale” (Allen 1976)
- Attempts to integrate temperature and time started 250 + years ago
- Development is widely believed to follow a sigmoid shape



Degree Day Model: Theory

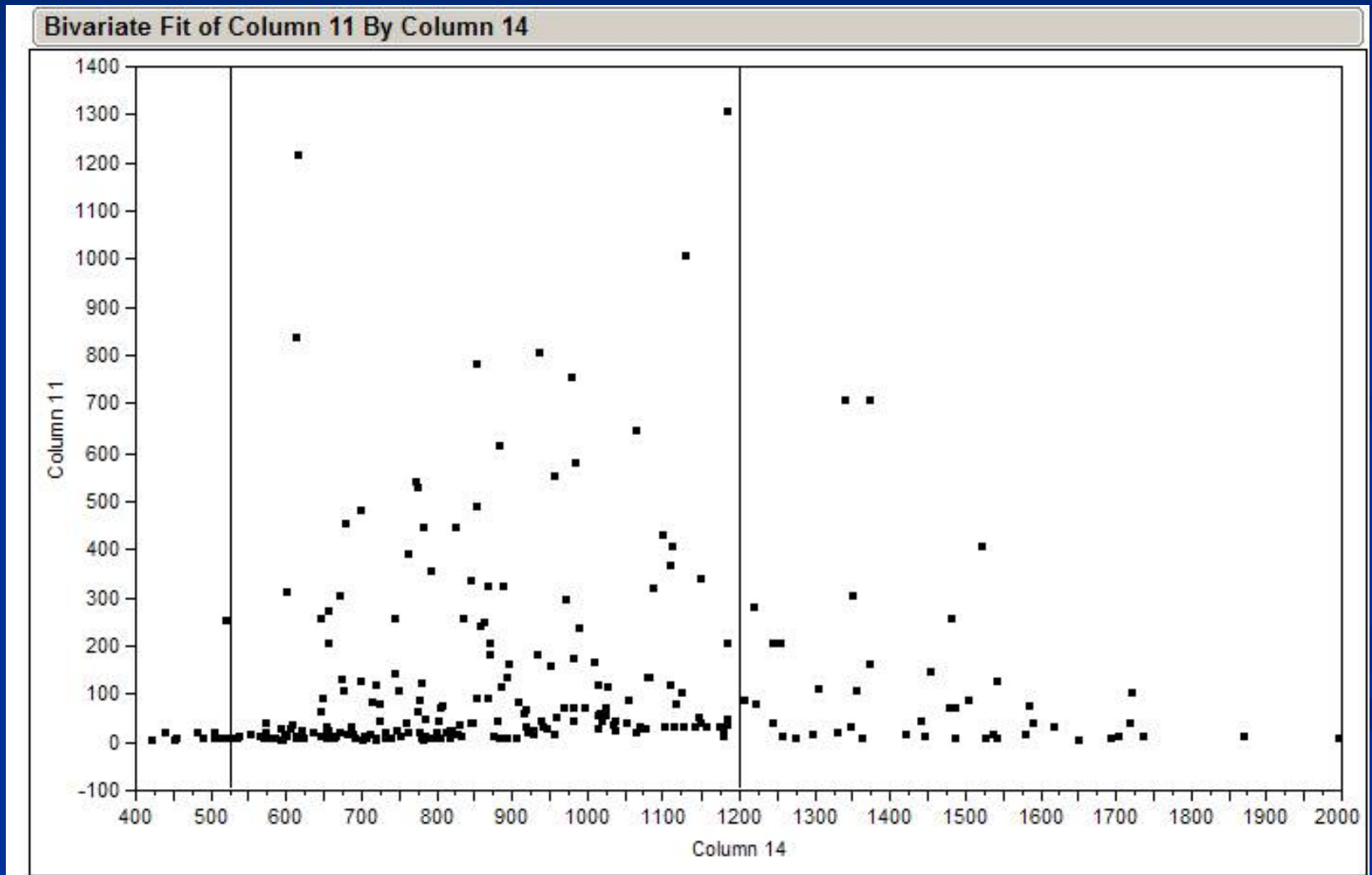
- Organisms have base developmental temperature- **minimum temperature below which no development occurs**
- Organisms have set number of units to complete development - physiological time: measured in developmental units (DU) or degree days (DD)
- Parameters established from lab or field studies



Trap Data

- Used data from 2006 to August 2007 from JB traps in APHIS Eastern Region
- JB adult activity occurs at approximately 500 degree days (DDs)
- NAPPFAST model parameters set initial beetle flight at 526 DDs

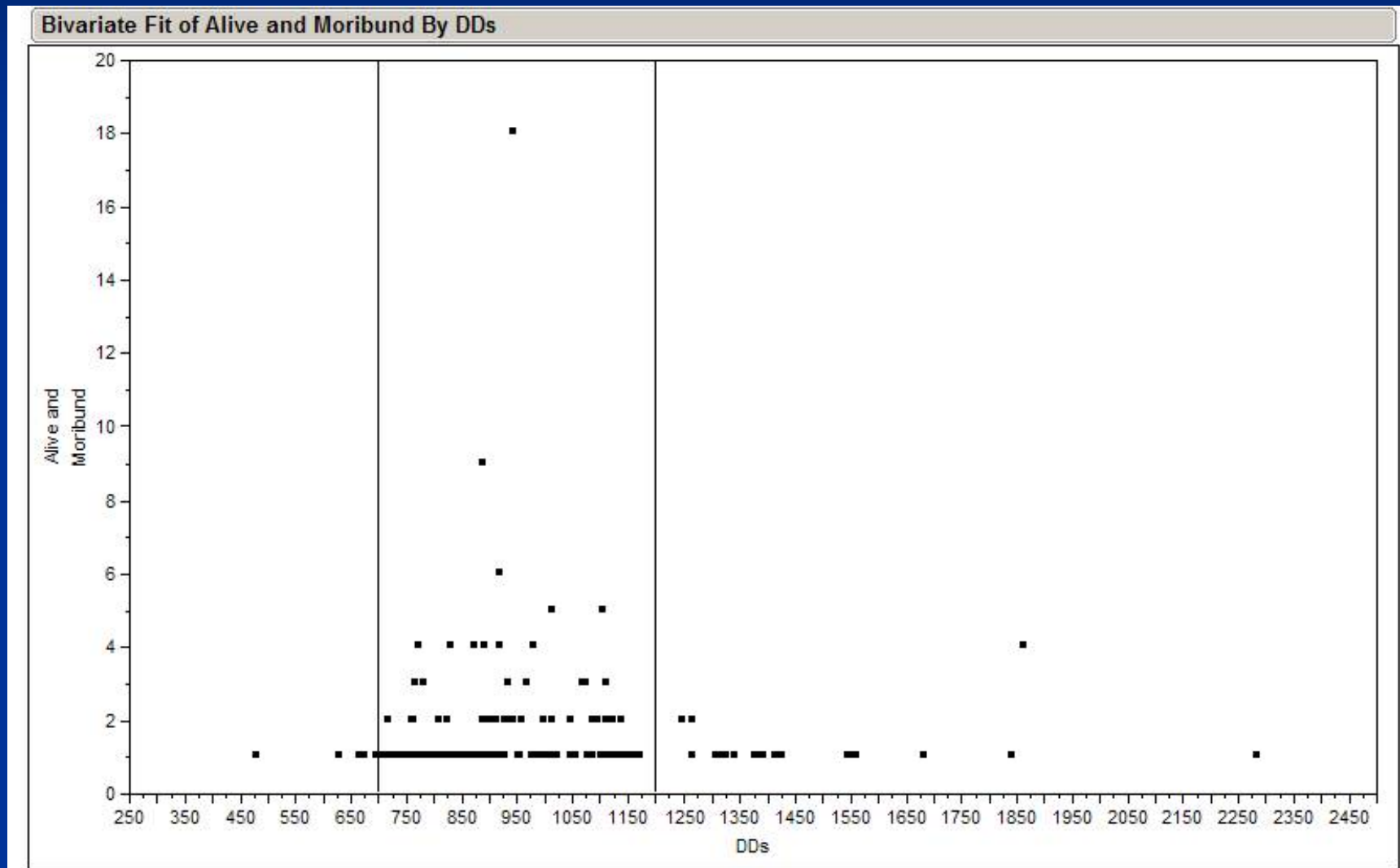
Average # per Trap vs. DDs



Airport Interception Data

- Used data from 2005-present of live JB interceptions at California airports
- Most interceptions (84.76%) occurred between 700-1200 DDs
- Most outbound beetles came from Indianapolis International or Airborne Airpark (Wilmington, OH). (70.73%)

Number of Live/Moribund JB per Interception vs. DDs



Summary

- DD model for JB is a useful tool to indicate timing of trap deployment (525 DD)
- Interception rate of JB in WR should rise about 200 DD after initial (700 DD)
- Additional data should validate these conclusions and allow for additional analysis to be done

Questions?

Dan Borchert

daniel.m.borchert@aphis.usda.gov

USDA/APHIS/CPHST/PERAL

1730 Varsity Drive Suite 300

Raleigh, NC 27606

919-855-7545